

**CITY OF BOULDER
CITY COUNCIL AGENDA ITEM**

MEETING DATE: NOVEMBER 25, 2008

AGENDA TITLE: Third reading and consideration of Ordinance No. 7621 amending Chapter 10-7.5, Green Building and Green Points Program," B.R.C. 1981 Adding Requirements Related to Energy Efficiency Thresholds for Remodels and Additions, Demolition, Boilers and Windows; and setting forth related details.

PRESENTERS:

Jane S. Brautigam, City Manager
Paul Fetherston, Deputy City Manager
Stephanie Grainger, Deputy City Manager
Maureen Rait, Executive Director of Public Works
Neil Poulsen, Chief Building Official
Kirk Moors, Senior Plans Examiner/Assistant Building Official
Jonathan Koehn, Environmental Affairs Manager
Elizabeth Vasatka, Environmental Coordinator

EXECUTIVE SUMMARY:

At the Nov. 10, 2008 City Council meeting, council adopted Ordinances 7620, 7622 and 7623 to increase energy efficiency in commercial construction and residential remodels and additions. This Council action also involved amending the "Building Code" to adopt minor changes related to the expiration of permits, and adopting the 2008 National Electrical Code (NEC) with minor local amendments.

In response to first reading questions, amendments to Ordinance No. 7621 were proposed by staff and supported by City Council at second reading. This third reading of Ordinance 7621 involves its proposed adoption as amended at second reading.

Key Issue Identification: Building codes should evolve to support and balance community sustainability objectives, including energy efficiency, reduction of carbon emissions, waste reduction and life-safety requirements.

STAFF RECOMMENDATION:

Staff recommends adoption of Ordinance 7621.

MOTION: Motion to adopt Ordinance 7621.

BACKGROUND:

First reading of the proposed code changes occurred on Oct. 21, 2008. Written materials from the first reading packet may be accessed at:

<http://www.bouldercolorado.gov/files/Clerk/Agendas/2008/10-21-08/3k.pdf>

City Council members identified questions at first reading. Responses to those questions were provided in the material for second reading on Nov. 10, 2008. The written material from the second reading packet may be accessed at:

<http://www.bouldercolorado.gov/files/Clerk/Agendas/2008/11-10-08/5f.pdf>


In response to first reading questions, amendments to Ordinance No. 7621 were proposed by staff and supported by City Council at second reading. This third reading of Ordinance 7621 involves its proposed adoption as amended at second reading. Second reading amendments clarify the following for residential remodels and additions:

- that the total size of the structure, including the addition, determines the required level of energy efficiency and when new construction requirements must apply to the entire structure [10-7.5-3 (b)], and
- the code requirements that apply to buildings with an air infiltration rate of 1.0 Natural Air Changes per Hour (NACH) or greater [10-7.5-3 (c)(2)(B)(i)].

NEXT STEPS:

These proposed code changes are planned for implementation during the first quarter of 2009.

Approved By:


Jane S. Brautigam,
City Manager

ATTACHMENT A: Ordinance 7621

ATTACHMENT A

ORDINANCE NO. 7621

AN ORDINANCE AMENDING CHAPTER 10-7.5, "GREEN BUILDING AND GREEN POINTS PROGRAM," B.R.C. 1981 ADDING REQUIREMENTS RELATED TO ENERGY EFFICIENCY THRESHOLDS FOR REMODELS AND ADDITIONS, DEMOLITION, BOILERS AND WINDOWS; AND SETTING FORTH RELATED DETAILS.

BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF BOULDER,
COLORADO:

Section 1. Paragraph 10-7.5-2 (a)(2), B.R.C. 1981, is amended to read:

10-7.5-2 Scope and Administration.

(a) Scope. The provisions of this chapter apply to the following:

- (1) New construction, remodels, or additions to a dwelling, including without limitation single-unit dwellings, multi-unit dwellings, and dwellings within mixed use developments.
- (2) Any two or more building permits for the same structure that are applied for in any 12 month period shall be considered as one application for the purpose of calculating green points meeting the requirements of Sections 10-7.5-3, "Mandatory Green Building Requirements," and 10-7.5-4, "Resource Conservation – Green Points," B.R.C. 1981.

....

Section 2. Subsection 10-7.5-3, B.R.C. 1981, is amended to read:

10-7.5-3 Mandatory Green Building Requirements.

- (a) Energy Efficiency - New Dwelling Units. An applicant for a building permit for each new dwelling shall demonstrate that the building is more energy efficient than a building that meets the minimum requirements of Chapter 10-7, "International Energy Conservation and Insulation Code," B.R.C. 1981. Table 1 lists the minimum energy efficiency requirements.

TABLE 1A - Tiers for Energy Efficiency Thresholds

Type of Project	Square Footage	Energy Efficiency Thresholds Above Code
New Construction	Up to 3,000	30 percent more energy efficient than 2006 IECC
	3,001-5,000	50 percent more energy efficient than 2006 IECC
	5,001 and up	75 percent more energy efficient than 2006 IECC
Multi-Unit Dwellings	Applies to all	30 percent more energy efficient than 2006 IECC*

~~*The city manager is authorized to develop a HERS rating sampling protocol for multi dwelling projects to ensure compliance with this section.~~

(b) Thresholds for Application of New Construction Standards to Entire Building as the Result of an Addition. Any addition which meets any of the thresholds described below will require that the conditioned floor area of the entire building be upgraded to meet new construction standards for energy efficiency in Subsection 10-7.5-3(a), B.R.C. 1981.

(1) The addition is 100 percent or more than the conditioned floor area of the existing dwelling unit and the dwelling unit will have a total conditioned floor area after the addition to the dwelling unit that is up to 3,000 sq. ft in size.

(2) The addition is 50 percent or more than the conditioned floor area of the existing dwelling unit and the dwelling unit will have a total conditioned floor area after the addition to the dwelling unit that is from 3,001 to 5000 sq. ft in size.

(3) The addition is 25 percent or more than the conditioned floor area of the existing dwelling unit and the dwelling unit will have a total conditioned floor area after the addition to the dwelling unit that is over 5001 sq. ft in size.

(c) Energy Efficiency – Additions and Remodels. An applicant for a building permit for a remodel or an addition to a dwelling that does not exceed the thresholds in subsection (b) above shall demonstrate that it meets the energy efficiency requirements of this section. A building permit for an addition to or a remodel of a dwelling unit shall meet one of the following standards:

(1) Requirement if upgrading the energy efficiency of the entire structure. The applicant may demonstrate that the entire building meets the HERS requirements that are described in Table 1B below; or

(2) Requirement for the new addition or the area of the house that is subject to a remodel. The applicant may demonstrate that the addition or the area of the building subject to a remodel meets the requirement of the IECC for the remodel

area or addition as described in Table 1.B. below. Building permits under this requirement shall also meet the following:

(A) Complete a blower door test before application for the building permit to determine whether the building has a fresh air infiltration rate of no more than 0.5 natural air changes per hour (NACH) compliance rating. If this standard is exceeded, then the applicant shall meet the requirement of paragraph (B).

(B) Improve, repair, and seal the dwelling unit, verified by a subsequent blower door test and prior to a certificate of occupancy or completion that demonstrates that:

(i) for buildings that had an air infiltration rate of 1.0 NACH or greater, then the building shall have a NACH 50 percent or less than the original blower door test,

(ii) for all other buildings, the building has an air infiltration rate of not greater than 0.5 NACH compliance rating.

TABLE 1 B – Energy Efficiency Thresholds for Remodels and Additions

<u>Total Conditioned Area</u>	<u>HERS Rating</u>	<u>Increased efficiency above the IECC</u>
<u>Up to 3,000</u>	<u>100</u>	<u>15 percent</u>
<u>3,001-5,000</u>	<u>85</u>	<u>30 percent</u>
<u>5,001 and up</u>	<u>70</u>	<u>50 percent</u>

(3) Remodels-Limitations. A remodel that does not substantially remove the interior finish of the thermal envelope of the conditioned space is not required to meet the energy efficiency requirements of Table 1B.

(b) Compliance with Energy Efficiency Requirements–HERS Index Rating. A new dwelling that is required to meet the energy efficiency requirements for new construction shall demonstrate that it meets such standard by:

(1) Shall be evaluated using the Home Energy Rating System (HERS). The HERS rating will be used for the verification of energy performance of new construction. A HERS rating shall be performed by a rater accredited by the Residential Energy Services Network (RESNET);

- (2) For multi-dwelling projects, through a HERS rating sampling protocol authorized and approved by the city manager; or
- (3) For multi-dwelling projects, by demonstrating that the energy efficiency has been achieved by using the methodology in section 404, "Simulated Performance Alternative" or section 506, "Total Building Performance" of the 2006 International Energy Conservation Code.
- (ee) Energy Audit. An applicant for a building permit for an addition to a dwelling or a remodel of a dwelling shall be required to obtain an energy audit. The applicant shall provide proof of the completion of the energy audit with a building permit application. The energy audit of the house shall quantify the annual energy performance of the building according to generally accepted standards for energy audits approved by the city manager. An energy audit or an optional HERS rating report will indicate how efficiently the building is operating and where inefficiencies are occurring.
- (df) Lighting Efficiency. Prior to final inspection for an addition to a dwelling or a remodel of a dwelling the applicant shall install energy efficient lamps (light bulbs) with a luminous efficacy of 40 lumens per watt or above in at least 50 percent of the existing home's light fixtures.
- (eg) Direct Vent Furnace. When the scope of the work of an addition to a dwelling or a remodel of a dwelling requires replacement of a furnace, the furnace shall be replaced with a direct vent unit that has a minimum 90 percent AFUE.
- (h) Direct Vent Boiler. When the scope of the work of an addition to a dwelling or a remodel of a dwelling requires replacement of a boiler, the boiler shall be replaced with a direct vent unit that has a minimum 85 percent AFUE.
- (fi) Construction Waste Recycling. An applicant for a building permit for a new dwelling or an addition to a dwelling shall demonstrate that a minimum of 50 percent of construction waste is recycled. Waste diversion calculations and tracking spreadsheet form must be provided at project completion which shows that the minimum recycling requirements have been met. No person shall fail to complete the diversion calculations and tracking spreadsheet or recycle construction waste as required by this section.
- (gi) Demolition Management. An applicant proposing to demolish the dwelling, as that term is defined in Section 10-7.5-7, "Definitions," B.R.C. 1981, more than 50 percent of exterior walls shall demonstrate through a deconstruction plan that at least 65 percent of material by weight from deconstruction of the existing structure, including concrete and asphalt, will be diverted from the landfill. Verification of deconstruction plan compliance must be provided prior to final inspection. No person shall fail to follow or otherwise implement an approved deconstruction plan.

Section 3. Subsection 10-7.5-4(a), B.R.C. 1981, is amended to read:

10-7.5-4 Resource Conservation – Green Points

- (a) Schedule for Green Points. Residential building permit applicants are required to earn green points according to the schedule in Table 2. An applicant proposing to increase the floor area of the existing building pursuant to section 10-7.5-3(b), “Thresholds for Application of New Construction Standards to Entire Building as the Result of an Addition.” B.R.C. 1981, shall be required to earn the amount of green points required for the new construction of a new dwelling of the same size of the existing dwelling with such addition.

TABLE 2 – Green Points Requirements

Project Description	Square Footage Thresholds	Green Point Requirements^{1 2}
New construction of single unit dwellings	1,501-3,000	20
	3,001-5,000	40
	5,001 and up	60
Additions to a dwelling	500- 1,000	15
	1,001- 2,000	20
	2,001 – 3,000	30
	3,001 and up	45
Interior remodels of a dwelling	500 – 1,000	10
	1,001 – 2,000	15
	2,001 – 3,000	20
	3,001 and up	30
Multi-unit Dwellings:³ final tenant finish of a unit in a multi-unit dwelling	1,001 – 2,000	10
	2,001 – 3,000	20
	3,001 and up	30

¹ One green point is awarded for each HERS rating score below the HERS index rating requirement.

² The green point values listed in Subsections 10-7.5-4(e) and (f) only apply to those projects that are not required to have a HERS index rating.

³ Each dwelling in a multi-unit dwelling shall be required to meet the green point requirements separately.

Section 4. Subsection 10-7.5-4(e), B.R.C. 1981, is amended to read:

10-7.5-4 Resource Conservation – Green Points

(e) Energy Efficiency.

- (1) Insulation. Points will be awarded according to the following:
 - (A) Minimum R-19 cavity plus R-5 sheathing wall insulation: 2 points.
 - (B) Minimum R-49 ceiling: 2 points.
 - (C) Exterior minimum R-10 insulation installed for the full height of a basement or foundation wall: 2 Points
 - (D) Insulated Pre-cast Concrete Foundation: 2 points
 - (E) Insulated Concrete Forms: 2 points
- (2) Windows: Up to 10 points. New windows or replacement windows installed as part of a remodel or an addition. Points will be awarded as follows:
 - (A) National Fenestration Rating Council (NFRC): Up to 5 points. Rated Window with Maximum U Value of ~~0.35~~0.34 or lower: .5 point for each window, up to 5 points.
 - (B) NFRC Rated Window with Maximum Solar Heat Gain Coefficient (SHGC) of 0.55: .5 point for each window, up to 5 points. Exception: South facing glass.
- (3) Air Sealing of an Existing Building. Points will be awarded when a HERS rating is applied to the existing structure preconstruction, then a post rating after construction showing:
 - (A) Ten percent net increase in initial HERS rating*: 2 points
 - (B) No net increase in initial HERS rating*: 3 points
 - (C) Decrease in initial HERS rating*: 5 points

*Because of the variability of existing construction, projecting the final HERS rating can be difficult and planning for contingencies if the planned HERS rating is not achieved should be done.

- (4) Heating, Ventilation and Air Conditioning (HVAC) Systems. Points will be awarded according to the following:

- (A) HVAC Commissioning: 3 points. Testing for duct leakage, firing rate, and refrigerant charge.
- (B) Ground Source Heat Pump: Up to 10 points. Points will be awarded according to the following:
 - (i) 30-39% calculations from a heating/cooling load bin analysis: 4 points
 - (ii) 40-49% calculations from a heating/cooling load bin analysis: 6 points
 - (iii) 50-59% calculations from a heating/cooling load bin analysis: 8 points
 - (iv) 60-69% calculations from a heating/cooling load bin analysis: 10 points
- (C) Direct Vent Combination Space/Water Heating System: 2 points
- ~~(D)~~ ENERGY STAR Boiler: 2 points
- ~~(E)~~ Zoned, Hydronic Radiant Heating: 2 points
- ~~(F)~~ Passive Cooling: 2-5 points (one point per item). Points will be awarded for passive cooling systems using any two or more of the techniques described below:
 - (i) Exterior vertical shading devices for east and west facing glass.
 - (ii) Reflective films or glass on east and west facing windows.
 - (iii) Radiant, heat-reflective barriers installed in the attic space.
 - (iv) Landscaping that shades east and west-facing glazing during the cooling season (June to September).
 - (v) South window overhang sized to effectively shade the window during the cooling season (June to September)
- ~~(G)~~ Whole House Fan: 2 points
- ~~(H)~~ Evaporative Cooling: 3 points

...

Section 5. Subsection 10-7.5-4(i), B.R.C. 1981, is amended to read:

10-7.5-4 Resource Conservation – Green Points

(i) Sustainable Products.

- (1) FSC-Certified Tropical Woods or No Tropical Wood: Up to 6 Points. Points will be awarded as follows:
 - (A) 2 BF of FSC lumber per SQ/FT of floor area (2 BF/SQ. FT.): 2 points
 - (B) 3 BF of FSC lumber per SQ/FT of floor area (3 BF/SQ. FT.): 4 points

- (C) 50% or more of dimensional lumber in total BF is FSC, excluding engineered wood products: 6 points
- (2) Environmentally Preferred Materials: Up to 10 Points. Points will be awarded environmentally preferred materials as follows:
- (A) Recycled content: 2 points
 - (B) Reclaimed: 2 points
 - (C) Bio-based: 2 points
 - (D) Agricultural residue: 2 points
 - (E) Low or no Volatile Organic Compounds (VOCs) emissions: 2 points
- (3) Locally Sourced Materials: Products that are environmentally preferable and/or extracted, processed, and manufactured within 500 miles of the city are considered local. A maximum of 1.5 points can be earned for any single component listed in the Environmentally Preferable Products Chart regardless of the amount by which a minimum performance threshold is exceeded. A “recycled content” product must contain a minimum of 25% post-consumer recycled content except as noted otherwise above. Post industrial (pre-consumer) recycled content is counted at half the rate of post-consumer content. Points will be awarded as shown on the Environmentally Preferable Products Chart below:

ENVIRONMENTALLY PREFERABLE PRODUCTS CHART

Assembly	Component	Product Specification Types (see Note 1)		
		Specifications	Emission Specifications	Local
Exterior Wall	Framing	FSC-certified		X
Exterior Wall	Framing	Finger-jointed studs (vertical use only for structural components)		X
Exterior Wall	Siding or masonry	Recycled content or FSC-certified		X

Floor	Flooring	Linoleum, cork, bamboo, FSC-certified or reclaimed wood, sealed concrete, recycled-content flooring, or combination in 45% of home's floor area.	Carpet & pad: comply with Carpet and Rug Institute's Green Label Plus Program	X
Floor	Flooring	BONUS 1/2 for 90% of home	BONUS 1/2 for NO carpet in home	
Floor	Framing	FSC-certified		X
Foundation	Aggregate			X
Foundation	Cement	Fly ash or slag as replacement for, not addition to, cement content (min. 30%)		X
Interior Wall	Framing	FSC-certified		X
Interior Wall	Framing	Finger-Jointed, (vertical use only for structural components)		X
Interior Walls AND ceilings	Gypsum board	Recycled content		X

Interior Walls AND millwork	Paint		Comply with Green Seal Standard GS-11, Paints, First Edition, May 20, 1993	
Interior Walls AND millwork	Wood finishes		VOC concentrations of 150 gpl or less	
Landscape	Decking or patio material	Recycled content or FSC-certified		X
Other	Cabinets	Recovered, recycled content, or FSC-certified	Wood and/or agrifiber products with no added urea-formaldehyde resins	X
Other	Counters	Recycled content	Wood and/or agrifiber products with no added urea-formaldehyde resins	
Other	Doors (not incl. garage)	Recycled content or FSC-certified	Wood and/or agrifiber products with no added urea-formaldehyde resins	X
Other	Trim	Recovered, recycled content, or FSC-certified	Wood and/or agrifiber products with no added urea-formaldehyde resins	
Other	Adhesives and sealants		VOC concentrations of 70 gpl or less	
Other	Windows	Recycled content or FSC-certified		X
Roof	Framing	FSC-certified		X
Roof	Roofing	Recycled content or vegetated (min. 200 sf)		X
Roof AND floor AND wall	Insulation	Recycled content (min 20%)	Comply with State of California, DHS, "Practice for Testing of VOCs from Building Materials using Small Chambers"	X

Roof, floor, wall (2 of 3)	Sheathing	Recycled content or FSC-certified		X
-------------------------------	-----------	-----------------------------------	--	---

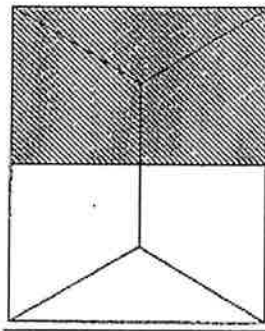
Section 6. Section 10-7.5-7, B.R.C. 1981, is amended by a new definition and changes to other definitions, to read:

10-7.5-7 Definitions.

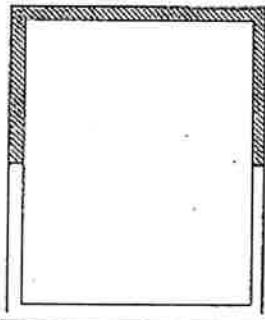
“Addition” An extension or increase in floor area of a building or structure of 500 sq. ft. or greater.

“Demolition” or “demolish” means an act or process which removes one or more of the following. The shaded area illustrates the maximum amount that may be removed without constituting demolition.

- (a) Fifty percent or more of the roof area as measured in plan view (see diagram);



- (b) Fifty percent or more of the exterior walls of a building as measured contiguously around the “building coverage” as defined in this section (see diagram); or



A wall shall meet the following minimum standards to be considered a retained exterior wall:

- (1) The wall shall retain studs or other structural elements, the exterior wall finish, and the fully framed and sheathed roof above that portion of the remaining building to which such wall is attached;
- (2) The wall shall not be covered or otherwise concealed by a wall that is proposed to be placed in front of the retained wall; and
- (3) Each part of the retained exterior walls shall be connected contiguously and without interruption to every other part of the retained exterior walls.

“Remodel” means an interior reconfiguration or upgrade of an existing structure of 500 sq.ft. or greater and the work required to complete the reconfiguration or upgrade requires a building permit.

Section 7. This ordinance shall be effective at 12:01 a.m. on March 2, 2009. It shall be applied to building permit applications submitted after the effective date. Building permits applied for before the effective date shall be considered under the program in effect at the time of application.

Section 8. This ordinance is necessary to protect the public health, safety, and welfare of the residents of the city, and covers matters of local concern.

Section 9. The city council deems it appropriate that this ordinance be published by title only and orders that copies of this ordinance be made available in the office of the city clerk for public inspection and acquisition.

INTRODUCED, READ ON FIRST READING, AND ORDERED PUBLISHED BY
TITLE ONLY this 21st day of October 2008.

Mayor

Attest:

City Clerk on behalf of the
Director of Finance and Record

READ ON SECOND READING, AMENDED, AND ORDERED PUBLISHED BY
TITLE ONLY this 10th day of November 2008.

Mayor

Attest:

City Clerk on behalf of the
Director of Finance and Record

READ ON THIRD READING, PASSED, ADOPTED, AND ORDERED PUBLISHED
BY TITLE ONLY this 25th day of November 2008.

Mayor

Attest:

City Clerk on behalf of the
Director of Finance and Record